ing of: 1. Inking, 2. Blanching to a light color, 3. Repetitive, periodic, jetting, and 4. Gradual darkening. C) Drifting, consisting of maintaining a characteristic posture with arms spread and skin dark, and D) burying, initiated in response to contact with sediment by the lower arms, and consisting of: excavating a hole with the siphon and covering of the animal with sediment thrown on its back with its arms, and simultaneously, blanching to a light color. It is postulated that this response evolved to facilitate escape from fish predators such as *Squalus*.

VISUAL DISCRIMINATION TRAINING OF LABORATORY REARED OCTOPUSES. Roger T. Hanlon and **John W. Forsythe,** The Marine Biomedical Institute, The University of Texas Medical Branch, Galveston, and **J. B. Messenger,** Department of Zoology, University of Sheffield, England.

For 30 years, wild-caught *Octopus vulgaris* have been used in Europe as models in comparative psychology, particularly in visual and tactile discrimination learning. Training results were often variable, which some researchers attributed to the different experience of octopuses in the wild previous to capture. We present here the first demonstration of visual discrimination learning on laboratory-reared octopuses that all had identical experience prior to training. Octopuses were trained consecutively to discriminate between plastic shapes of the same area but differing either in brightness (black rectangle vs. white), form (white cross vs. diamond), or orientation (white rectangle held horizontally vs. vertically). Four *Octopus maya* were trained at 5 months posthatching (150 g each). The results for 12 consecutive sessions (8 trials per session) were: brightness 66%, 93%, 83%, 100% correct attacks; form 52%, 80%, 92%, 83% correct attacks; orientation 50%, 77%, 71%, 73% correct attacks. Eight *O. maya* from the same culture brood were trained similarly at 9 months posthatching (1,200 g each). The results were: brightness 54%, 59% 75%, 69%; and form 50%, 80%, 76%, 81% correct attacks. In general, these preliminary observations suggest that the younger, smaller octopuses showed keener discrimination. Five *Octopus bimaculoides* were trained 7 months posthatching (60 g each). The results in consecutive sessions were: brightness 48%, 56%, 79%, 81%, 83% correct attacks; form 55%, 62%, 67%, 69%; orientation 54%, 53%, 62%, 53%. This species generally did as well as young *O. maya* on brightness discrimination, but form discrimination was poor, and no orientation discrimination was evident, although training by a different method may yield different results. Overall, the results are encouraging because they indicate that different species of laboratory-reared octopuses are suitable for visual discrimination training. Furthermore, octopuses may be trained throughout the life cycle to study ontogenetic changes in learning ability.

OBSERVATIONS ON THE REPRODUCTIVE BIOLOGY OF *OCTOPUS BURRYI*, VOSS 1950. John W. Forsythe, The Marine Biomedical Institute, The University of Texas Medical Branch, Galveston.

Information on the reproductive biology of *Octopus burryi* was obtained by laboratory rearing a wild-caught mature female octopus. The female was trawl-caught in February 1981 from a depth of 47 m in the northern Gulf of Mexico approximately 80 miles south of Galveston, Texas. The animal was reared in a 150 ℓ closed seawater system using artificial seawater. At the time of capture the octopus had a live wet weight of 204 g and a dorsal mantle length of 107 mm making it the largest specimen of this species on record. Twenty-two days after capture, the female began laying a large brood of eggs which she carried in her arms throughout their developmental period. Approximately 35,000 eggs were laid weighing a total of 91.3 g, 44% of the female's prespawning weight. Egg length excluding the stalk was 2.2–2.5 mm. Hatching occurred from 24 to 36 days after egg-laying indicating a development time of approximately four weeks at 23°C. Hatchlings were very small, having a mean dorsal mantle length of 1.5 mm and mean total length of 2.5 mm. The female occasionally accepted food up to 20 days post egg-laying, but refused it thereafter and died 19 days after the last hatchlings were observed (WW = 115 g, ML = 70 mm). An attempt was made to culture the planktonic hatchlings in a circular dish-bottomed tray (1 m diameter) suspended in a 2000 ℓ closed seawater system. The octopuses were fed live plankton, principally copepods, which they actively attacked and captured. Maximum survival was 18 days with no significant growth observed.

NOTES ON THE LABORATORY CULTURE OF *OCTOPUS BIMACULOIDES*, THE CALIFORNIA MUD-FLAT OCTOPUS. John W. Forsythe, Randal H. DeRusha and **Roger T. Hanlon,** The Marine Biomedical Institute, The University of Texas Medical Branch, Galveston.

More than 50 *Octopus bimaculoides* were reared from hatching to sexual maturity and a subsequent F_2 generation in closed recirculating seawater systems. The culture systems held 2500 ℓ of artificial seawater. The main population of octopuses was reared at 17 to 18°C, but a second group of animals was reared at 22 to 24°C. The primary foods were small, live mysidacean shrimps for octopus hatchlings and progressively larger, live palaeomonid and penaeid shrimps for growing octopuses. *Octopus bimaculoides* also accepted a wide range of supplemental food organisms including amphipods, crabs, bivalve and gastropod molluscs, polychaete worms and fishes. Survival through the life cycle was good. Greatest mortality occurred during the first two weeks, mainly from premature hatching and cannibalism. Over 50% of the octopuses alive after one month survived to one year of age. The life span appears to be at least 12 months; at this writing over 30 octopuses have lived beyond 13 months. The first sign of sexual maturation in males was the appearance of the hectocotylus at four to five months posthatching. Among the warm-water reared octopuses, mating was first observed at 8 months and egg-laying at 10 months; in the cold-water population it was 10 and 12.5 months, respectively. Growth was exponential during the first four months. The warm-water group grew at an overall rate of